### 🔂 Change: Force and Motion

#### **Enduring Understandings**

Patterns of change can

Cause and effect relationships are routinely identified, tested and used to affect motion? explain change.

**Essential Ouestions** 

**Standards** 

What can electric be used to make predictions. forces do?

How does force

What do forces do?

What happens when forces are balanced or unbalanced?

3-PS2.1 - Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.

3-PS2.2 - Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.

3-PS2.3 - Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.

3-PS2.4 - Define a simple design problem that can be solved by applying scientific ideas about magnets.\*

3-5-ETS1.1 - Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1.2 - Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1.3 - Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

IL.SEL.3-5.3.B.2b - Generate alternative solutions and evaluate their consequences for a range of academic and social situations.

3-5.SEP.1.A - Ask questions about what would happen if a variable is changed.

3-5.SEP.1.B - Identify scientific (testable) and non-scientific (non-testable) questions.

3-5.SEP.1.C - Ask questions that can be investigated and predict reasonable

Knowledge 💥

Students will understand that force and motion are dependent on one another.

Students will understand that force and motion are present and relevant in our daily lives.

Students will understand that relationships exist between force and motion.

Students will know and be able to determine the effects of balanced and unbalanced forces on the motion of an object.

Students will know and be able to identify cause and effect relationships of electric or magnetic interactions between two objects that are not in contact with each other.

Students will know and be able to apply their understanding of magnetic interactions to define a simple design problem that can be solved with magnets.

Academic Language

Word Level

inertia, friction, gravity, push, pull, force, motion, attract, repel, magnet, permanent, temporary, balanced, Lodestone, North Pole, South Pole, Magnetic Field, bold words, labels

Sentence Level

Patterns of change can be used to make predictions, because... Cause and effect relationships... Electric forces can... Force affects motion. because... When forces are balanced... When forces are unbalanced... captions

Discourse Level

explanatory text informational articles sidehar diagrams how-to writing

outcomes based on patterns such as cause and effect relationships.

- 3-5.SEP.1.D Use prior knowledge to describe problems that can be solved.
- 3-5.SEP.1.E Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost.
- 3-5.SEP.2.A Identify limitations of models.
- 3-5.SEP.2.B Collaboratively develop and/or revise a model based on evidence that shows the relationships among variables for frequent and regular occurring events.
- 3-5.SEP.2.C Develop a model using an analogy, example, or abstract representation to describe a scientific principle or design solution.
- 3-5.SEP.2.D Develop and/or use models to describe and/or predict phenomena.
- 3-5.SEP.2.E Develop a diagram or simple physical prototype to convey a proposed object, tool, or process.
- 3-5.SEP.2.F Use a model to test cause and effect relationships or interactions concerning the functioning of a natural or designed system.
- 3-5.SEP.3.A Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered
- 3-5.SEP.3.B Evaluate appropriate methods and/or tools for collecting data.
- 3-5.SEP.3.C Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution.
- 3-5.SEP.3.D Make predictions about what would happen if a variable changes.
- 3-5.SEP.3.E Test two different models of the same proposed object, tool, or process to determine which better meets criteria for success.
- 3-5.SEP.4.A Represent data in tables and/or various graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships.
- 3-5.SEP.4.B Analyze and interpret data to make sense of phenomena, using logical reasoning, mathematics, and/or

computation.

- 3-5.SEP.4.C Compare and contrast data collected by different groups in order to discuss similarities and differences in their findings.
- 3-5.SEP.4.D Analyze data to refine a problem statement or the design of a proposed object, tool, or process.
- 3-5.SEP.4.E Use data to evaluate and refine design solutions.
- 3-5.SEP.5.A Decide if qualitative or quantitative data are best to determine whether a proposed object or tool meets criteria for success.
- 3-5.SEP.5.B Organize simple data sets to reveal patterns that suggest relationships.
- 3-5.SEP.5.C Describe, measure, estimate, and/or graph quantities (e.g., area, volume, weight, time) to address scientific and engineering questions and problems.
- 3-5.SEP.6.A Construct an explanation of observed relationships (e.g., the distribution of plants in the back yard).
- 3-5.SEP.6.B Use evidence (e.g., measurements, observations, patterns) to construct or support an explanation or design a solution to a problem.
- 3-5.SEP.6.C Identify the evidence that supports particular points in an explanation.
- 3-5.SEP.6.D Apply scientific ideas to solve design problems.
- 3-5.SEP.6.E Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution.
- 3-5.SEP.7.A Compare and refine arguments based on an evaluation of the evidence presented.
- 3-5.SEP.7.B Distinguish among facts, reasoned judgment based on research findings, and speculation in an explanation.
- 3-5.SEP.7.C Respectfully provide and receive critiques from peers about a proposed procedure, explanation, or model by citing relevant evidence and posing specific questions.
- 3-5.SEP.7.D Construct and/or support an argument with evidence, data, and/or a model.
- 3-5.SEP.7.E Use data to evaluate claims about cause and effect.
- 3-5.SEP.7.F Make a claim about the merit of a solution to a problem by citing

relevant evidence about how it meets the criteria and constraints of the problem.

- 3-5.SEP.8.A Read and comprehend grade-appropriate complex texts and/or other reliable media to summarize and obtain scientific and technical ideas and describe how they are supported by evidence.
- 3-5.SEP.8.B Compare and/or combine across complex texts and/or other reliable media to support the engagement in other scientific and/or engineering practices.
- 3-5.SEP.8.C Combine information in written text with that contained in corresponding tables, diagrams, and/or charts to support the engagement in other scientific and/or engineering practices.
- 3-5.SEP.8.D Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem.
- 3-5.SEP.8.E Communicate scientific and/or technical information orally and/or in written formats, including various forms of media and may include tables, diagrams, and charts.
- 3-ESS2.1 Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.
- 3-5.NOS.1.A Science methods are determined by questions.
- 3-5.NOS.1.B Science investigations use a variety of methods, tools, and techniques.
- 3-5.NOS.2.A Science findings are based on recognizing patterns.
- 3-5.NOS.2.B Scientists use tools and technologies to make accurate measurements and observations.
- 3-5.NOS.3.A Science explanations can change based on new evidence.
- 3-5.NOS.4.A Science theories are based on a body of evidence and many tests.
- 3-5.NOS.4.B Science explanations describe the mechanisms for natural events.
- 3-5.NOS.5.A Science is both a body of knowledge and processes that add new knowledge.
- 3-5.NOS.5.B Science is a way of knowing that is used by many people.
- 3-5.NOS.6.A Science assumes consistent patterns in natural systems.

- 3-5.NOS.6.B Basic laws of nature are the same everywhere in the universe.
- 3-5.NOS.7.A Men and women from all cultures and backgrounds choose careers as scientists and engineers.
- 3-5.NOS.7.B Most scientists and engineers work in teams.
- 3-5.NOS.7.C Science affects everyday life.
- 3-5.NOS.7.D Creativity and imagination are important to science.
- 3-5.NOS.8.A Science findings are limited to what can be answered with empirical evidence.
- 3-5.PS2.A Forces and motion ~ The effect of unbalanced forces on an object results in a change of motion. Patterns of motion can be used to predict future motion. Some forces act through contact, some forces act even when the objects are not in contact. The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center.
- 3-5.PS3.A Definitions of energy ~ Moving objects contain energy. The faster the object moves, the more energy it has. Energy can be moved from place to place by moving objects, or through sound, light, or electrical currents. Energy can be converted from one form to another form.
- 3-5.PS3.B Conservation of energy and energy transfer ~ Moving objects contain energy. The faster the object moves, the more energy it has. Energy can be moved from place to place by moving objects, or through sound, light, or electrical currents. Energy can be converted from one form to another form.
- 3-5.PS3.C Relationship between energy and forces ~ When objects collide, contact forces transfer energy so as to change the objects' motions.
- 3-5.CCC.1.A Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena and designed products.
- 3-5.CCC.1.B Patterns of change can be used to make predictions.
- 3-5.CCC.1.C Patterns can be used as evidence to support an explanation.
- 3-5.CCC.2.A Cause and effect relationships are routinely identified, tested, and used to explain change.
- 3-5.CCC.2.B Events that occur together with regularity might or might not be a cause and effect relationship.

3-5.CCC.3.B - Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume. 3-5.CCC.4.A - A system is a group of related parts that make up a whole and can carry out functions its individual parts cannot. 3-5.CCC.4.B - A system can be described in terms of its components and their interactions. 3-5.CCC.5.C - Energy can be transferred in various ways and between objects. 3-5.CCC.7.A - Change is measured in terms of differences over time and may occur at different rates. 3-5.SEP.5.D - Create and/or use graphs and/or charts generated from simple algorithms to compare alternative solutions to an engineering problem. 3-5.CCC.5.A - Matter is made of particles. 3-5.CCC.5.B - Matter flows and cycles can be tracked in terms of the weight of the substances before and after a process occurs. The total weight of the substances does not change. This is what is meant by conservation of matter. Matter is transported into, out of, and within systems. RI.3.1 - Ask and answer questions to demonstrate understanding of a text. referring explicitly to the text as the basis for the answers. RI.3.5 - Use text features and search tools (e.g., key words, sidebars, hyperlinks) to locate information relevant to a given topic efficiently. RI.3.8 - Describe the logical connection between particular sentences and paragraphs in a text (e.g., comparison, cause/effect, first/second/third in a sequence). Enduring **Essential** Knowledge Academic Septembel Understandings <sup>⋈</sup> **Standards** Questions Language Knowledge 💥 **Enduring** Essential **Academic** Standards **Understandings Ouestions** & Skills Language **? Patterns: Weather** 

# **Enduring Understandings**

**Ouestions** 

relationship between

climate and location?

**Essential** 

**Standards** 

### Knowledge M Academic Language

Scientists record patterns What is the of the weather across different times and areas so that they can make predictions about what kind of weather might happen

Climate describes a

extent to which those

range of an area's typical

weather conditions and the

conditions vary over years.

- What is the relationship between weather and climate?
- To what extent do we have control over the impacts of weather-related hazards?
- d How has our ability to affect the negative impact of natural disasters evolved over time?

- 3-5-ETS1.1 Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or
- 3-5-ETS1.2 Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
- 3-5-ETS1.3 Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
- 3-ESS2.1 Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.
- 3-ESS2.2 Obtain and combine information to describe climates in different regions of the world.
- 3-ESS3.1 Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.\*
- 3-5.CCC.1.B Patterns of change can be used to make predictions.
- 3-5.CCC.1.C Patterns can be used as evidence to support an explanation.
- 3-5.CCC.2.A Cause and effect relationships are routinely identified. tested, and used to explain change.
- 3-5.CCC.3.A Natural objects and/or observable phenomena exist from the very small to the immensely large or from very short to very long time periods.
- 3-5.CCC.7.B Some systems appear stable, but over long periods of time will eventually change.
- 3-5.ESS2.A Earth materials and systems ~ Four major Earth systems interact. Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, organisms, and gravity break rocks, soils, and sediments into smaller pieces and move them around.
- 3-5.ESS2.C The roles of water in Earth's surface processes ~ Most of Earth's water is in the ocean and much of the Earth's fresh water is in glaciers or underground.
- 3-5.ESS2.D Weather and climate ~ Climate describes patterns of typical weather conditions over different scales and variations. Historical weather

Students will be able to understand typical weather in different parts of the world

& Skills

- Students will be able to identify weather conditions during various seasons
- Students will understand that a variety of natural hazards result from natural process
- Students will be able to construct weather tools and use them to gather information.
- Students will be able to create a graph or table and analyze it to describe weather patterns and relationships.
- Students will be able to conduct research from books and other reliable resources to obtain and combine information to explain weather phenomena.

## Mord Level

atmosphere, climate, evaporation, humidity. precipitation, radar, temperature, barometer, storm, patterns, weather, meteorologist. anemometer, predications, forecast, natural disasters. season, conditions. phenomena. variation. thermometer

🔯 Sent<u>ence Level</u>

The weather conditions... The relationship between climate and location can be described as... The patterns in the weather show... occurs when...

Discourse Level

graph, articles, sidebars, intervals, report. forecast/prediction, list, maps, audio broadcast, newspaper

patterns can be analyzed. 3-5.ESS3.B - Natural hazards ~ A variety of hazards result from natural processes; humans cannot eliminate hazards but can reduce their impacts. 3-5.NOS.1.A - Science methods are determined by questions. 3-5.NOS.1.B - Science investigations use a variety of methods, tools, and techniques. 3-5.NOS.2.A - Science findings are based on recognizing patterns. 3-5.NOS.2.B - Scientists use tools and technologies to make accurate measurements and observations. 3-5.NOS.3.A - Science explanations can change based on new evidence. 3-5.NOS.4.A - Science theories are based on a body of evidence and many tests. 3-5.NOS.4.B - Science explanations describe the mechanisms for natural events. 3-5.NOS.5.A - Science is both a body of knowledge and processes that add new knowledge. 3-5.NOS.5.B - Science is a way of knowing that is used by many people. 3-5.NOS.6.A - Science assumes consistent patterns in natural systems. 3-5.NOS.6.B - Basic laws of nature are the same everywhere in the universe. 3-5.NOS.7.A - Men and women from all cultures and backgrounds choose careers as scientists and engineers. 3-5.NOS.7.B - Most scientists and engineers work in teams. 3-5.NOS.7.C - Science affects everyday life. 3-5.NOS.7.D - Creativity and imagination are important to science. 3-5.NOS.8.A - Science findings are limited to what can be answered with empirical evidence.

**Enduring** Understandings X **Essential Ouestions** 

**Standards** 

sometimes be observed.

3-5.CCC.6.A - Different materials have different substructures, which can

> Knowledge Academic & Skills

Language

January

February

March

**Enduring Essential** Knowledge 👷 **Academic Standards Understandings Ouestions** Language **Enduring Essential** Academic **Standards Understandings Ouestions** Language

Relationships: Life Science

Reproduction is essential 🔯 How does a living

Plants and animals have

All cycles have patterns

Adaptation is the key to

Observable phenomena

exist from very short to very

long time periods

explain change

cycles

of change

organisms

Cause and effect

relationships are used to

Plants and animals have

All cycles have patterns

differences in patterns can

be used to sort and classify natural phenomena

Reproduction is essential

to continued existence of all

Patterns of change can

unique and diverse life

imilarities and

unique and diverse life

**Understandings** 

**Enduring** 

organisms

cycles

of change

survive

to continued existence of all thing evolve through a life cycle?

**Questions** 

How does an organisms survive?

Differential How do patterns help us predict change?

Do only the strong survive?

What determines who survives?

How do living things grow and change?

How do living things interact?

https://hawthorn73-il.perfplusk12.com/curric/Landscape\_map2.aspx?ReportEngine=-99&CourseID=195&teacher\_id=528

3-5.LS1.A - Structure and function ~ Organisms have both internal and external macroscopic structures that allow for growth, survival, behavior, and reproduction.

**Standards** 

3-5.LS1.B - Growth and development of organisms ~ Reproduction is essential to every kind of organism. Organisms have unique and diverse life cycles.

3-5.LS1.C - Organization for matter and energy flow in organisms ~ Food provides animals with the materials and energy they need for body repair, growth, warmth, and motion. Plants acquire material for growth chiefly from air, water, and process matter and obtain energy from sunlight, which is used to maintain conditions necessary for survival.

3-5.LS2.A - Interdependent relationships in ecosystems ~ The food of almost any animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants, while decomposers restore some materials back to the soil.

3-5.LS2.B - Cycles of matter and energy transfer in ecosystems ~ Matter cycles between the air and soil and among organisms as they live and die.

3-5.LS2.C - Ecosystem dynamics, functioning, and resilience ~ When the environment changes some organisms survive and reproduce, some move to new locations, some move into the transformed environment, and some die.

3-5.LS2.D - Social interactions and group behavior ~ Being part of a group helps animals obtain food, defend themselves. and cope with changes.

3-5.LS3.A - Inheritance of traits ~ Different organisms vary in how they look and function because they have different inherited information; the environment also affects the traits that an organism

Knowledge 💥

Compare and contrast plant and animal life cycles

Develop models to describe unique organisms and diverse life cycles

Explain how changes in the environment can affect the life cycle

Describe a life cycle and its importance to existence

Explain the patterns of a life cycle **Academic** Language

Word Level

organisms, reproduction, survival. adaptation, compare, contrast, growth, life cycle, relationships, interaction, observe, hereditary, natural selection, structure

Sentence Level Plants/animals are

unique/diverse, because... The has an adaptation that helps it... Living things grow and change by... intéracts

by... Something I noticed about the relationship between \_\_\_ and

Discourse Level

article, explanatory. side bar, bold words, italics, caption, diagram, map, labels, heading, table of contents, chart, index. glossary, subtitle, list, table/chart

- Living things are interdependent with their living and nonliving surroundings
- Adaptation is the key to survive

develops.

- 3-5.LS3.B Variation of traits ~ Different organisms vary in how they look and function because they have different inherited information; the environment also affects the traits that an organism develops.
- 3-5.LS4.A Evidence of common ancestry and diversity ~ Some living organisms resemble organisms that once lived on Earth. Fossils provide evidence about the types of organisms and environments that existed long ago.
- 3-5.LS4.B Natural selection ~ Differences in characteristics between individuals of the same species provide advantages in surviving and reproducing.
- 3-5.LS4.C Adaptation ~ Particular organisms can only survive in particular environments.
- 3-5.LS4.D Biodiversity and humans ~ Populations of organisms live in a variety of habitats. Change in those habitats affects the organisms living there.
- 3-LS1.1 Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.
- 3-LS2.1 Construct an argument that some animals form groups that help members survive.
- 3-LS3.1 Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.
- 3-LS3.2 Use evidence to support the explanation that traits can be influenced by the environment.
- 3-LS4.1 Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.
- 3-LS4.2 Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.
- 3-LS4.3 Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.
- 3-LS4.4 Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.\*

3-5.ESS2.E - Biogeology ~ Living things can affect the physical characteristics of their environment.	
3-5.ESS2.E - Biogeology ~ Living things can affect the physical characteristics of their environment.	
3-5.LS1.A - Structure and function ~ Organisms have both internal and external macroscopic structures that allow for growth, survival, behavior, and reproduction.	
3-5.LS1.B - Growth and development of organisms ~ Reproduction is essential to every kind of organism. Organisms have unique and diverse life cycles.	
3-5.LS1.C - Organization for matter and energy flow in organisms ~ Food provides animals with the materials and energy they need for body repair, growth, warmth, and motion. Plants acquire material for growth chiefly from air, water, and process matter and obtain energy from sunlight, which is used to maintain conditions necessary for survival.	
3-5.LS1.D - Information Processing ~ Different sense receptors are specialized for particular kinds of information; Animals use their perceptions and memories to guide their actions.	
3-5.LS2.A - Interdependent relationships in ecosystems ~ The food of almost any animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants, while decomposers restore some materials back to the soil.	
3-5.LS2.B - Cycles of matter and energy transfer in ecosystems ~ Matter cycles between the air and soil and among organisms as they live and die.	
3-5.LS2.C - Ecosystem dynamics, functioning, and resilience ~ When the environment changes some organisms survive and reproduce, some move to new locations, some move into the transformed environment, and some die.	
3-5.LS2.D - Social interactions and group behavior ~ Being part of a group helps animals obtain food, defend themselves, and cope with changes.	
3-5.LS3.A - Inheritance of traits ~ Different organisms vary in how they look and function because they have different inherited information; the environment also affects the traits that an organism develops.	
3-5.LS3.B - Variation of traits ~ Different organisms vary in how they look and function because they have different inherited information; the environment	

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			3-5.LS4.C - Adaptation ~ organisms can only survivenvironments.				
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			3-5.NOS.7.C - Science af life.	fects everyday			
April	Enduring Understandings	Essential Questions	Standards	×	Knowledge 💥 & Skills	Academic Language	×
May	Enduring Understandings	Essential Questions	Standards	×	Knowledge X	Academic Language	×
June	Enduring Understandings	Essential Questions	Standards	×	Knowledge X	Academic Language	×
July	Enduring Understandings	Essential X Questions	Standards	×	Knowledge ×	Academic Language	<b>X</b> <